REMARKS/ARGUMENTS

Upon entry of the present amendment, claims 1-8, 10-15, and 35-38 will be pending in this application and presented for examination. Claim 1 has been amended. Claim 38 has been canceled without prejudice or disclaimer. Claim 14 contains allowable subject matter. Reconsideration is respectfully requested.

Claim 1 has been amended to recite that the textile has an embedded nanoparticle by way of diffusion. Support is found, for example, in paragraphs 25 and 47. As such, no new matter has been entered. Applicants respectfully request that the Examiner enter the amendment.

I. FIRST REJECTION UNDER 35 U.S.C. § 103(a)

Claims 1-8, 10-13, 15, and 35-37 were rejected under 35 U.S.C. §103(a) as allegedly being obvious over U.S. Patent No. 6,645,569 ("Cramer *et al.*").

In this regard, the Examiner's attention is respectfully directed to the enclosed 37 CFR § 1.131 declaration. Although Applicants assert that Cramer *et al.* does not render the present invention obvious, the enclosed declaration establishes prior invention in the United States prior to the effective date of Cramer *et al.* (January 30, 2001). As such, Applicants respectfully request that the Examiner withdraw the rejection.

II. SECOND REJECTION UNDER 35 USC § 103(a)

Claims 1, 6, 8, 10-13, 15, 35-37 were rejected under 35 U.S.C. §103(a) as allegedly being obvious over CN 1241662. According to the Examiner, CN 1241662 teaches that silver and silver oxide are formed *in situ* and the fabric is thereafter ironed or thermally compressed. The Examiner states that the forgoing process imbeds the nanoparticles in the fabric, as the fabric is immersed in the treating solution. In response, Applicants respectfully disagree.

Claim 1 of the present invention has been amended to clearly differentiate the cited art. In the present invention, the textile material comprises an embedded nanoparticle distributed in a gradually diluted pattern, wherein a higher density is near or at the surface, and

gradually decreasing density toward the core. Preformed nanoparticles are allowed to *diffuse* into the textile, to generate the diluted pattern.

CN 1241662 describes a material that is made via an *in situ* process that soaks the fabric in a treating solution to arrive at a homogeneous distribution of silver throughout the fabric. There is no teaching or suggestion of preformed nanoparticles diffusing into the fabric. Thus, there can be no gradually diluted distributed pattern as is currently taught and claimed.

Further, CN 1241662 requires that the fabric be part of and exposed to a chemical reaction process that can be quite harsh. For example, the concentrated sodium hydroxide, which is part of the process disclosed therein, can destroy certain fabrics. As there is no teaching or suggestion of nanoparticles being allowed to *diffuse* into the textile, to generate the diluted pattern, Applicants respectfully request that the Examiner withdraw the rejection.

III. SECOND REJECTION UNDER 35 USC § 103(a)

Claims 1, 6, 8, 10-13, 15, 35-37 were rejected under 35 U.S.C. §103(a) as allegedly being obvious over CN 1306117. According to the Examiner, CN 1306117 teaches a "fully soak and roll" method which allegedly is merely a variation of the method used to prepare the textiles of the present invention. In response, Applicants respectfully disagree.

CN 1306117 teaches a concentrated ammonia process whereby the fabric is soaked and rolled. Again, the CN 1306117 process will generate a homogenous distribution of metal, unlike the textile that has embedded nanoparticles distributed in a gradually diluted pattern as is currently taught and claimed. There is absolutely no teaching or suggestion of diffusion of the nanoparticles as is currently taught and claimed. Therefore, Applicants respectfully request that the Examiner withdraw the rejection.

IV. THIRD REJECTION UNDER 35 USC § 103(a)

Claims 1, 6, 8 10-13, 15, and 35-37 were rejected under 35 U.S.C.§ 103(a) as allegedly being obvious over FR 2 799 392. The Examiner alleges that the FR patent teaches nanoparticles of oxides of tin, antimony, indium and cadmium and these particles are used to

treat textiles. The fabric is treated with a dispersion and heated. The Examiner states that such a method renders the currently claims obvious. In response, Applicants respectfully disagree.

The FR patent does not teach or suggest the present invention as there can be no diffusion in the processes used therein. In order to ensure a diffusion process, there should be a high surface concentration of particle, heating to the glass transition temperature and adequate time to effectuate the diffusion process.

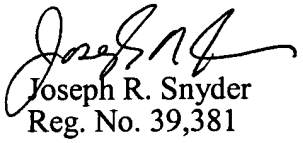
The processes disclosed in the FR patent do not have the requisite condition to be a diffusion process, therefore the textile material does not comprise embedded nanoparticles distributed in a gradually diluted pattern, wherein a higher density is near or at the surface, and gradually decreasing density toward the core. The requisite conditions are simply not present. Therefore, Applicants respectfully request that the Examiner withdraw the rejection.

V. CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 925-472-5000.

Respectfully submitted,



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Attachments
JS:js
60477834 v1

PATENT
Docket No.: 18062G-004100US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Gang Sun, et al.

Application No.: 10/037,785

Filed: October 22, 2001

For: DYEING TEXTILES USING NANOPARTICLES

Examiner: Margaret V. Einsmann

Art Unit: 1751

DECLARATION UNDER 37 CFR § 1.131

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

We, the undersigned inventors, declare as follows:

1. We are the only inventors of the invention claimed in the above-captioned patent application.

2. We understand that in an Office Action, certain of the claims have been rejected as allegedly being obvious over Cramer et al., U.S. Patent No. 6,645,569, filed on January 30, 2002, which claims priority to U.S. Provisional Patent Application No. 60/265,013, filed on January 30, 2001.

3. We conceived the invention disclosed and claimed in the relevant claims of the instant application prior to January 30, 2001 and were diligent in reducing to practice the same before such date.

4. Enclosed as Exhibit A is an excerpt of a joint inventor's laboratory notebook, provided to illustrate our diligence in reducing the invention claimed in the above-identified application to practice. Pages 3-7 of the laboratory notebook include a detailed account of the materials, test procedures, test results, and analyses of the same in connection with our efforts to improve, test, and reduce the claimed invention to practice.

5. The dates on the pages of the enclosed Exhibit A have been redacted. All such redacted dates are prior to January 30, 2001.

6. We further declare that all statements made herein of our knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date: 5/5/05

Gang Sun

Date: 5/5/2005

Dapeng Li

Composition of (Triton X100) amt.

Mixture I*		Mixture II**	
[a]CB	2	CB	2
[b]dis.	2	dis.	2
[c]H_2O	36	H_2O	36

all "g"
for 2hrs stirring

a. c see
b. SDBS (Sodium dodecyl benzene Sulfonate)
* addition to 2 drops of Triton X100
** " " 30 drops " " "

Cotton fabrics ═══
PET/cotton ═══
Nylon ═══
PET, (disperse dyeable) ═══

Acrylics ═══
PET2 (cationic dyeable) ═══ → into Mixture II / into mixture I

other fabrics (except for PET2)
are ═══ into Mixture I
═══ into mixture II

→ Heating process:

1. 65°C for 20mins;
2. 65 ~ 80/90°C and keep heating for 30mins, (for 95°C Max.)
   (Indicator "30" → 90°C)
3. Take Nylon fabrics out of the oven and increase Temp. from 80 to 125°C for 30mins;
4. Take {cotton / PET/cotton} out of the oven and increase Temp from 125°C to 155°C for 30mins. (Indicator "4" → 150°C)

→ 5-time detergent Washing.

Hydrophilicity ←——→ (except for Nylon)

Nylon	PET disperse dyeable	PET cationic dyeable	PET/cotton	Acrylics	Cotton
				—	/

	Mixture I*	Mixture II**
pig.	2	2
dis.	2	6
H_2O	36	~~36~~ 72

a. SDBS

* stirring for 2.2 hrs

** Stirring for 3 hrs (much more viscous)

(A) Nylon: 75~80°C for 20mins, ~~125~~ ~130°C for 20mins. (Indication "37")

PET (disperse dyeable): 75~80°C for 20mins, 125 ~~130~~°C for 20mins, 155°C for 20mins. (Indication "42")

Cotton: 75~80°C for 20mins, ~~125~~ ~130°C for 20mins.

Note: ▭ into Mixture I, ▭ into Mixture II.

→ After heating, each ▭ appears darker than its ▭ counterpart! (Remember: The wt% of pig. is same for Mixture I & II)

→ But After 5-time detergent washing ▭ and ▭ seem no remarkable differences in darkness.

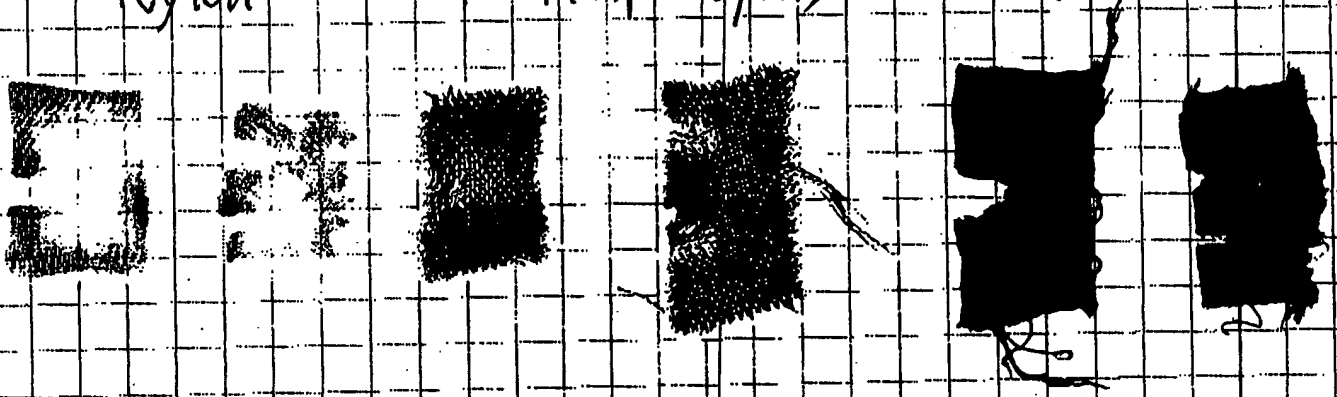
(B) → Introduce each piece of fabric into 1M Na_2SO_4 solution overnight, and then (after ~15hrs) apply the same heating progress as mentioned above, heat from 65°C to 175°C and keep for 5 mins at 175°C.

Ⓐ Nylon | PET disperse dyeable | cotton

Ⓑ Nylon | PET disperse dyeable | Cotton

Apply the fabrics pigmented on for heating experiments
Increase From 75°C to 175°C and the keep heating for 5mins.

Nylon PET (disperse dyable) Cotton



Deductions:

① Increase of the amount of dis. seems, at least NOT helpful but slightly harmful instead for pigmentation.

② The addition of Triton X-100 did not increase the darkness as we expected.

③ The difference on of darkness among all pigmented fabrics indicates that a dispersant which can bridge the nano-particles and the polymeric fabrics so that the particles can readily be carried into the opening structures of the polymeric fabrics as a result of heating up to tg. might be essential as a vehicle or a channel thru which the pigment can move in the nano form.

Probs.

① If the dispersions made are nano-sized? — "Yes" is the basic assumption for the above deductions.

② different dis. for different polymeric fabrics, like

③ anionic dis. ↔ cationic fabrics

~~water soluble~~ polymeric or copolymeric dis. ...

③ How to destroy the dis. after its work done

- different dis. might need different post-treatments but they all should be easy enough for industrial applicability.
- The post-treatments might follow with another heating program.

Mixture I

a. Pig. 2
b. dis. 1
H₂O 37

Mixture II (comparative)

Dec. Pig. 2
dis. 1
H₂O 37

(all "g")

b. $C_{61}H_{73}PICH_2(CH_3)_2\overset{\oplus}{N}\cdot Cl^{\ominus}$ H_2O Stirring for 2hrs

a. Black Pearls 4560

c. Decoloring carbon

→ The fabrics pigmented are cotton, PET/cotton, acrylics and PET (dispersable dyeable)

→ dip-pad-dry: 2 dip 2 pad (each pad for 1~1.5 mins)

(A) → Heating: 105°C into oven for 20mins and then increase to 180°C keep heating for 5mins (actually 170~180°C)

(B) → Cold water washing up the pig. powder and dis. on the surface of each piece of fabrics and then heat again: 75°C into oven, increase to 105°C (takes ~20mins), then increase to 180°C and keep heating for 5mins (indicator "5"), actually 175~180°C

(A) and (B) show no remarkable different in darkness.

(A) (B)

Cotton acrylics PET PET/cotton | Cotton acrylics PET PET/cotton